

## APPENDIX A

### EVIDENCE TABLE ON EFFICACY

<b>Efficacy</b>				
<b>Author</b>	<b>Reference</b>	<b>Study Design</b>	<b>Class</b>	<b>Clinical/Experimental</b>
Wood, Colloca, Mathews <sup>6</sup>	JMPT 2001; 24:260–271.	Prospective, randomized comparative clinical RCT	1	Clinical
Keller, Colloca <sup>8</sup>	JMPT 2000; 23(9):585–595.	Cohort Study	1	Clinical
Yurkiw, Mior <sup>28</sup>	Chiropractic Technique 1996; 8(4):155–162.	RCT (pilot study)	1	Clinical
Gemmell, Jacobson <sup>31</sup>	JMPT 1995; 18(7):453–456.	RCT	1	Clinical
Yates, Lamping, Abram, Wright <sup>54</sup>	JMPT 1988; 11(6):484–488.	RCT	1	Clinical
Symons, Herzog, Leonard, Nguyen <sup>13</sup>	JMPT 2000; 23(3):155–9.	Experimental Basic Science Investigation	2	Experimental
Hawk, Azad, Phongphua, Long <sup>17</sup>	JMPT 1999; 22:436–443.	Cohort	2	Clinical
Herzog, Kawchuk, Conway <sup>43</sup>	JNMS 1993; 1:52–58.	Experimental	2	Experimental
Polkinghorn, Colloca <sup>2</sup>	JMPT 2001; 24(9):589–595.	Case study	3	Clinical
Polkinghorn BS, Colloca CJ <sup>15</sup>	JMPT 1999; 22:411–416.	Case report	3	Clinical
Polkinghorn, Colloca <sup>21</sup>	JMPT 1998; 21:187–96.	Case report	3	Clinical
Cooperstein <sup>26</sup>	Chiropractic Technique 1997; 9(3):108–114.	Review of the Literature	3	
Polkinghorn <sup>30</sup>	JMPT 1995; 18:105–115.	Single case report	3	Clinical
Polkinghorn <sup>32</sup>	Chiropractic Technique 1995; 7:98–102.	Case study	3	Clinical
Polkinghorn <sup>33</sup>	Chiro Sports Med 1995; 9:44–51.	Case study	3	Clinical
Polkinghorn <sup>37</sup>	JMPT 1994; 17(7):474–484.	Case Study	3	Clinical

Osterbauer, De Boer, Widmaier, Petermann, Fuhr <sup>39</sup>	JMPT 1993; 16:82–90.	Case Series	3	Clinical
Osterbauer, Derickson, Peles, DeBoer, Fuhr, Winters <sup>44</sup>	JMPT 1992; 15(8):501–511.	Descriptive Case Series	3	Clinical
Frach, Osterbauer, Fuhr <sup>46</sup>	JMPT 1992; 15:596–8.	Case study	3	Clinical
Phillips <sup>47</sup>	Chiropractic: The Journal of Chiropractic Research and Clinical Investigation 1992; 8(2):38–39.	Case study	3	Clinical
Richards, Thompson, Osterbauer, Fuhr <sup>49</sup>	Americal Journal of Chiropractic Medicine 1990; 3:25–32.	Case studies	3	Clinical

Author	Number	Ages	Intervention	Results
Wood, Colloca, Mathews <sup>6</sup>	30 (11 men, 19 women)	23–59 years old	Manual versus mechanical adjusting techniques	Equal effectiveness between the manual and mechanical adjusting groups during the treatment period and at one month follow up. Cervical ROM showed statistically significant changes for both groups during the treatment phase, but the differences between groups was not statistically significant at the end of treatment or one month follow up
Keller, Colloca <sup>8</sup>	40	Na	AII (max setting) vs sham (AII min setting) vs 20 min rest	70% of SMT increased myoelectric output by > 10% (approx range, –10% to 65%); 20% of sham increased yoelectric output by > 10% (approx range, –10% to 25%); 20% of control ncreased yoelectric output by > 10% (approx range, –15% to 75%). 20.5% mean increase in myoelectric output for SMT group by paired t-test ( $p < 0.001$ );

Yurkiw, Mior <sup>28</sup>	14	Between the ages of 18 and 55; mean age = 37.4 yrs; 11 females, 3 males	Comparison of MAD (Activator) and SMT (diversified)	No statistical differences between MAD and SMT treatments
Gemmell, Jacobson <sup>31</sup>	30	18–65 years	Activator or Meric Thrust	The results indicate that there is no significant difference between Meric and Activator adjustments in reducing acute low back pain ( $F = .005$ , $df = 2.27$ , $p = .941$ )
Yates, Lamping, Abram, Wright <sup>54</sup>	21	Mean Age 45.14 (Active); 51.71 (Placebo); 51.43 (Control); $F(2,18) = 1.476$ , $p < 0.255$	Active Group-Activator Placebo group-Sham Control- No Treatment	Pertaining to efficacy, this study reported statistically significant decreases in blood pressure among those patients receiving chiropractic adjustment to the upper thoracic spine with an activator adjusting instrument as compared to those receiving a sham treatment with the same device set to the “off” position, and a control group receiving no treatment.
Symons, Herzog, Leonard, Nguyen <sup>13</sup>	9	21–40 years	Activator thrust delivered to 12 spinal locations	Cervical thrusts elicited positive responses 50% of the time; Thoracic SMT thrusts elicited positive responses 72% of the time at T2–T3, 83% of the time at T6–T8, and 22% of the time at T11–T12; Lumbar SMT thrusts delivered to L2–L4 elicited positive responses 83% of the time; and Sacroiliac SMT thrusts delivered to the PSIS elicited positive responses 94% of the time. The average positive response rate for the entire spine was 68%.
Hawk, Azad, Phongphua, Long <sup>17</sup>	18	12 male (21–48 yo, mean 30) & 6 female (24–46 yo, mean 37)	Flexion-distraction table (active) and Activator (sham)	Main result: improvement in VAS (pain) & GWBS (wellness) scale post sham adjustment (non-significant)

Herzog, Kawchuk, Conway <sup>43</sup>	83	Na	Spinal manipulative therapy – manual and mechanical (Activator)	There was no significant correlation between preload and Change if F forces for tx's using Activator Instrument, whereas in 4/5 manual techniques a significant correlation between preload and change if F forces was found. Preload forces were defined as the mean force exerted over a period of 1–2s before the treatment thrust. Peak forces were defined as the largest force measured during SMT. Change if F was calculated as the change in force from preload to peak force.
Polkinghorn, Colloca <sup>2</sup>	1	35	AAI	35 y/o female, 5 year history post failed surgery X2, resolved with AII
Polkinghorn, Colloca <sup>15</sup>	F 29 YOA,	Na	Activator treatment 9x /4 weeks, exercise	Improvement in leg length Vas decreased
Polkinghorn, Colloca <sup>21</sup>	1	M 26 YOA,	Activator treatment 8 weeks	Improvement in leg length
Cooperstein <sup>26</sup>			Activator Adjusting Instrument	With regard to efficacy, this study offers a review of various studies that are part of the MAD committee's review process which need not be discussed here.
Polkinghorn <sup>30</sup>	1	53 year-old female	Activator treatment protocol full-spine	A single case report plus good review (on frozen shoulder) treated by Activator protocol over 6 months. Outcome measures are not very clearly stated.
Polkinghorn <sup>32</sup>	1	50 y/o female with metastatic Ca to shoulder and frozen shoulder.	AAI	50% inc ROM, and reduce pain in 3 days. Discharged in 7 days.
Polkinghorn <sup>33</sup>	3	F 59 YOA, F 55 YOA, F 71 YOA	Activator treatment; 15 tx/8 wks; 8 tx/4 wks, 10 tx/4wks.	Less symptoms

Polkinghorn <sup>37</sup>	1	54 yrs.	Activator Adjustment and Homeopathic treatment of the knee	This study provides class 3 evidence of successful management of a patient with knee pain and a medical meniscus tear through chiropractic care using the Activator Adjusting Instrument as the only form of chiropractic treatment together with the application of a homeopathic ointment. Because the use of homeopathic ointment provides a confounding variable, no definitive conclusions can be made regarding the treatment effect of the Activator Adjusting Instrument in this case.
Osterbauer, De Boer, Widmaier, Petermann, Fuhr <sup>39</sup>	10	NA	Activator protocol at 3 visits/week for 5 weeks	Significant decreases in VAS pain score and Oswestry score, decreased number of positive provocation tests
Osterbauer, Derickson, Peles, DeBoer, Fuhr, Winters <sup>44</sup>	10	19–75 Years	(SMT) delivered by means of an Activator Adjusting Instrument to the cervical spine; Four of ten subjects who had severe acute pain also received interferential electrotherapy; 6 of the patients reported taking pain medication (OTC or prescribed) which was not monitored in a consistent manner	Mean pain scores decreased from 44.1 to 10.5 ( $t = 4.93$ ; $p < .0001$ ) and mean total range of motion increased from 234 to 297 degrees ( $t = 5.6$ ; $p < .0001$ ). At 1 year, 7 respondents noted stability of their symptoms at or near the level reported immediately after the 6-wk treatment regime
Frach, Osterbauer, Fuhr <sup>46</sup>	2	M – 37 YOA, F – 18 YOA	Activator adjusting, high-voltage electrotherapy	Improvement of symptoms

Phillips <sup>47</sup>	1		Application of activator method	Noticeable reduction of exudate and pain symptoms was evident three days later. Continued care resulted in both ears being clear of exudate. Acute otitis media reappeared five and six months later. Adjustment of the C1 resulting in clearing of symptoms.
Richards, Thompson, Osterbauer, Fuhr <sup>49</sup>	2	Case One: 54-yr-old male Case Two: 36-yr-old female	Case One: pelvic blocking, high force galvanic, passive weight assisted stretching, adjustments with the Activator Case Two: same as above.	Case One: Resolution of 4 mm disc bulge at L4 with care. Case Two: No change to 4 mm L3 disc herniation, but a 3 mm change at the L4 disc level, with shifting away from the nerve root.

## APPENDIX B

### EVIDENCE TABLE ON USE AND USAGE

Use and Usage				
Author	Reference	Study Design	Class	Clinical/Experimental
Wood, Colloca, Mathews <sup>6</sup>	JMPT 2001; 24(4):260–271.	Prospective, randomized comparative clinical trial, RCT	1	Clinical
Keller, Colloca <sup>8</sup>	JMPT 2000; 23(9):585–595.	Cohort Study	1	Clinical
Yates, Lamping, Abram Wright <sup>54</sup>	JMPT 1988; 11(6):484–488.	RCT	1	Clinical
Colloca, Keller <sup>3</sup>	JMPT 2001; 24(8):489–500.	Cohort study	2	Experimental.
Colloca, Keller <sup>5</sup>	Spine 2001; 26(10):1117–1124.	Experimental	2	Experimental
Gleberzon <sup>14</sup>	JCCA 2000; 44(3):157–168.	Experimental	2	Experimental
Keller, Colloca, Fuhr <sup>16</sup>	JMPT 1999; 22(2):75–86.	Experimental	2	Experimental
Hawk, Azad, Phongphua, Long <sup>17</sup>	JMPT 1999; 22(7):436–443.	Cohort	2	Clinical
Nathan, Keller <sup>35</sup>	JMPT 1994; 17:431–441.	Experimental	2	Experimental
Kawchuk, Herzog <sup>42</sup>	JMPT 1993; 16:573–577.	Experimental	2	Experimental
Herzog, Kawchuk, Conway <sup>43</sup>	JNMS 1993; 1(2):52–58.	Experimental	2	Experimental
Osterbauer, Derickson, Peles, DeBoer, Fuhr, Winters <sup>44</sup>	JMPT 1992; 15(8):501–511.	Descriptive Case Series	2	Clinical
Polkinghorn, Colloca <sup>2</sup>	JMPT 2001; 24(9):589–595.	Case study	3	Clinical
Gleberzon <sup>7</sup>	JCCA 2001; 45(2):86–99.	Review of the Literature	3	NA
Hawk, Long, Boulanger, Morschhauser, Fuhr <sup>11</sup>	J Am Geriatric Soc 2000; 48:534–545.	Case series	3	Clinical
Polkinghorn, Colloca <sup>15</sup>	JMPT 1999; 22(6):411–416.	Case report	3	Clinical

Schneider, Cox, Polkinghorn, Blum, Getzoff, Troyanovich <sup>19</sup>	Chiropractic Technique 1999; 11(1):1–32.	Hypothetical Case Study	3	NA
Nykoliation, Mierau <sup>20</sup>	JCCA 1999; 43(3):161–167.	Case study	3	Clinical
Polkinghorn, Colloca <sup>21</sup>	JMPT 1998; 21(3):187–196.	Case report	3	Clinical
Polkinghorn <sup>22</sup>	JMPT 1998. 21(2):114–121.	Case study	3	Clinical
Cooperstein <sup>26</sup>	Chiropractic Technique 1997; 9(3):108–114.	Review of the Literature	3	NA
Polkinghorn <sup>30</sup>	JMPT 1995; 18:105–115.	Single case report	3	Clinical
Polkinghorn <sup>32</sup>	Chiropractic Technique 1995; 7:98–102.	Case study	3	Clinical
Polkinghorn <sup>33</sup>	Chiro Sports Med 1995; 9:44–51.	Case study	3	Clinical
Osterbauer, Fuhr, Keller <sup>34</sup>	In Advances in Chiropractic (vol.2). 1995. 471–520.	Literature synthesis	3	NA
Polkinghorn <sup>37</sup>	JMPT 1994; 17(7):474–484.	Case Study	3	Clinical
Osterbauer, De Boer, Widmaier, Petermann, Fuhr <sup>39</sup>	JMPT 1993; 16:82–90.	Case series	3	Clinical
Phillips <sup>47</sup>	Chiropractic: The Journal of Chiropractic Research and Clinical Investigation 1992. 8(2):38–39.	Case study	3	Clinical
Byfield <sup>48</sup>	Eur J Chiro 1991; 39:45–52.	RCT commentary only	3	Clinical
Richards, Thompson, Osterbauer, Fuhr <sup>49</sup>	Am J Chiro Med 1990; 3:25–32.	Case studies	3	Clinical



Author	Number	Ages	Intervention	Results
Wood, Colloca, Mathews <sup>6</sup>	30 (11 men, 19 women)	23–59 years old	Manual versus mechanical adjusting techniques	Equal effectiveness between the manual and mechanical adjusting groups during the treatment period and at one month follow up. Cervical ROM showed statistically significant changes for both groups during the treatment phase, but the differences between groups was not statistically significant at the end of treatment or one month follow up
Keller, Colloca <sup>8</sup>	40	Na	AII (max setting) vs sham (AII min setting) vs 20 min rest	70% of SMT increased myoelectric output by > 10% (approx range, –10% to 65%); 20% of sham increased yoelectric output by > 10% (approx range, –10% to 25%); 20% of control increased yoelectric output by > 10% (approx range, –15% to 75%). 20.5% mean increase in myoelectric output for SMT group by paired t-test ( $p < 0.001$ )
Yates, Lamping, Abram, Wright <sup>54</sup>	21	Mean Age 45.14 (Active); 51.71 (Placebo); 51.43 (Control); $F(2,18) = 1.476$ , $p < 0.255$	Active Group Activator Placebo group Sham Control No Treatment	With regard to usage, this study reports the use of the Activator Adjusting Instrument in the treatment of upper thoracic subluxations in a population of patients with hypertension
Colloca, Keller <sup>3</sup>	22	M F 15–73 years of age	Activator	Activator was used as an experimental tool to impart a force to the spine, the reaction of the spine and surrounding structures was measured.
Colloca, Keller <sup>5</sup>	20 (10 male)	age > 55 yo; new patient or no visits prior 6 months	Activator impulse to T8–SI joint	Main result: local reflex response noted in 21–25% of impulses delivered, in 19 (95%) patients
Gleberzon <sup>14</sup>	150 students randomly assigned to 16 groups	Na	Literature review and report	Recommended techniques to be added to the curriculum in rank order are Thompson (100%), Gonstead (97%), Activator (94%)....

Keller, Colloca, Fuhr <sup>16</sup>	Na	Na	Comparison of Activator Adjusting Instrument and electronic PCB impact hammer as applied to a steel beam	The authors found that the AAI instrument produced a highly reproducible peak impulse forces. The resonant frequency was predicted by the AAI and the PCB hammer. But the AAI produced variations in the magnitude of the driving point impedance at the resonant frequency were high. This problem was offset with the addition of a pre-load control frame.
Hawk, Azad, Phongphua, Long <sup>17</sup>	18	12 male (21–48 yo, mean 30) & 6 female (24–46 yo, mean 37)	Flexion-distraction table (active) and Activator (sham)	Main result: improvement in VAS (pain) & GWBS (wellness) scale post sham adjustment (non-significant)
Nathan, Keller <sup>35</sup>	3	NA	Activator impulse to spinous process of T11–L3	Displacement of IMD in axial rotation, flex-extension rotation, PA shear were observed while recording force-time history. Derivative values calculated such as stiffness
Kawchuk, Herzog <sup>42</sup>	5 (1 for each technique)		Cervical SMT	Preload force = 22N (average), peak force = 41N (low), duration = 32 msec (fast)
Herzog, Kawchuk, Conway <sup>43</sup>	83	Na	Spinal manipulative therapy – manual and mechanical (Activator)	There was no significant correlation between preload and Change if F forces for tx's using Activator Instrument, whereas in 4/5 manual techniques a significant correlation between preload and change if F forces was found. Preload forces were defined as the mean force exerted over a period of 1–2s before the treatment thrust. Peak forces were defined as the largest force measured during SMT. Change if F was calculated as the change in force from preload to peak force.

Osterbauer, Derickson, Peles, DeBoer, Fuhr, Winters <sup>44</sup>	10	19–75 years	SMT) delivered by means of an Activator Adjusting Instrument to the cervical spine; Four of ten subjects who had severe acute pain also received interferential electrotherapy; 6 of the patients reported taking pain medication (OTC or prescribed) which was not monitored in a consistent manner	Mean pain scores decreased from 44.1 to 10.5 ( $t = 4.93$ ; $p < .0001$ ) and mean total range of motion increased from 234 to 297 degrees ( $t = 5.6$ ; $p < .0001$ ). At 1 year, 7 respondents noted stability of their symptoms at or near the level reported immediately after the 6-wk treatment regime
Polkinghorn, Colloca <sup>2</sup>	1	35	AAI	35 y/o female, 5 year history post failed surgery X2, resolved with AII
Gleberzon <sup>7</sup>	Na	Na	Literature Search	21 studies related to Activator technique found (3 technique descriptions, 6 case studies, 2 case series, 8 experimental studies, and 2 clinical trials)
Hawk, Long, Boulanger, Morschhauser, Fuhr <sup>11</sup>	805 patients from 44 DC's	55 and older	Multiple chiropractic techniques	The only relevant point is that an unknown proportion of DC's in the US & 2 unspecified provinces use Activator in geriatric patients.
Polkinghorn, Colloca <sup>15</sup>	F 29 YOA,	Na	Activator treatment 9x /4 weeks, exercise	Improvement in leg length VAS decreased
Schneider, Cox, Polkinghorn, Blum, Getzoff, Troyanovich <sup>19</sup>	1	36 years	Activator Methods Chiropractic Technique (Relevant) and several other chiropractic techniques	Proponent of the Activator Method, discussed treatment protocols (visit frequency and duration) of AMCT being consistent with those recommended by the Mercy Conference Practice Guidelines.
Nykoliation, Mierau <sup>20</sup>	3	Female, age range 32–48.	MAD	No confounding issues are presented, explored or discussed.
Polkinghorn, Colloca <sup>21</sup>	1	M 26 YOA,	Activator treatment 8 weeks	Improvement in leg length
Polkinghorn <sup>22</sup>	1		Application Activator Adjusting Instrument	Patient showed complete resolution of symptoms after 3.5 months.

Cooperstein <sup>26</sup>			Activator Adjusting Instrument	Instruments were developed in chiropractic to “invest the thrust with a greater degree of controllable and repeatable speed, depth and direction (p.109).” “The Activator Adjusting Instrument (AAI) is the most widely used thrusting device among chiropractors and has been in use for approximately 20 years. The percussive device was awarded a patent and is recognized under the Food and Drug Administration Medical Devices Act. It has also been qualified as a method of manual manipulation, which permits practitioners to be reimbursed under the Medicare program
Polkinghorn <sup>30</sup>	1	53 year-old female	Activator treatment protocol full-spine	A single case report plus good review (on frozen shoulder) treated by Activator protocol over 6 months. Outcome measures are not very clearly stated.
Polkinghorn <sup>32</sup>	1	50 y/o female with metastatic Ca to shoulder and frozen shoulder.	AAI	50% inc ROM, and reduce pain in 3 days. Discharged in 7 days.
Polkinghorn <sup>33</sup>	3	F 59 YOA, F 55 YOA, F 71 YOA	Activator treatment; 15 tx/8 wks; 8 tx/4 wks, 10 tx/4wks.	Less symptoms
Osterbauer, Fuhr, Keller <sup>34</sup>				At the outset, the authors indicate that” AMCT procedures of subluxation detection and chiropractic adjusting have not been scientifically validated” (p.475) and “that there is no estimate for overall efficacy and effectiveness of these procedures are available at this time” (p.475)

Polkinghorn <sup>37</sup>	1	54 yrs.	Activator Adjustment and Homeopathic treatment of the knee	This study reports the usage of the Activator Adjusting Instrument in the treatment of knee pain and associated medial meniscus tear.
Osterbauer, De Boer, Widmaier, Petermann, Fuhr <sup>39</sup>	10	NA	Activator protocol at 3 visits/week for 5 weeks	Significant decreases in VAS pain score and Oswestry score, decreased number of positive provocation tests
Phillips <sup>47</sup>	1		Application of activator method	Noticeable reduction of exudate and pain symptoms was evident three days later. Continued care resulted in both ears being clear of exudate. Acute otitis media reappeared five and six months later. Adjustment of the C1 resulting in clearing of symptoms.
Byfield <sup>48</sup>				Dr. Byfield states the Activator is an alternative to manual cervical SMT and that it produces “consistent, controlled force”, and cites several older references on the technical specifications of the device
Richards, Thompson, Osterbauer, Fuhr <sup>49</sup>	2	Case One: 54-yr-old male Case Two: 36-yr-old female	Case One: pelvic blocking, high force galvanic, passive weight assisted stretching, adjustments with the Activator Case Two: same as above.	Case One: Resolution of 4 mm disc bulge at L4 with care. Case Two: No change to 4 mm L3 disc herniation, but a 3 mm change at the L4 disc level, with shifting away from the nerve root.

## APPENIDX C

### EVIDENCE TABLE ON SAFETY

Safety				
Author	Reference	Study Design	Class	Clinical/Experimental
Wood, Colloca, Mathews <sup>6</sup>	JMPT 2001; 24:260–271.	Prospective, randomized comparative clin trial RCT	1	Clinical
Keller, Colloca <sup>8</sup>	JMPT 2000; 23(9):585–595.	Cohort Study, (unclear if the patients were randomized to groups)	1	Clinical
Gemmell, Jacobson <sup>23</sup>	Chiro Technique 1998; 10: 8–10.	RCT	1	Clinical
Yates, Lamping, Abram, Wright <sup>54</sup>	JMPT 1988; 11(6):484–488.	RCT	1	Clinical
Solinger <sup>12</sup>	Clinical Biomechanics 2000; 15(2):87–94.	Experimental	2	Experimental
Fuhr, Green, Colloca, Keller <sup>25</sup>	Activator Methods Chiropractic Technique 1997; 443–450.	Experimental	2	Experimental
Kawchuk, Herzog <sup>42</sup>	JMPT 1993; 16:573–577.	Experimental	2	Experimental
Triano <sup>1</sup>	In: Tolison CD, et al, eds. Practical Pain Management, 3rd Edition. Lippincott Williams and Wilkins 2002, pp. 109–119.	Book Chapter – Review of the Literature	3	Na
Polkinghorn, Colloca <sup>2</sup>	JMPT 2001; 24(9):589–595.	Case study	3	Clinical
Triano <sup>4</sup>	The Spine Journal 2001; 1(2):121–130.	Literature synthesis	3	Na
Nykoliation, Mierau <sup>20</sup>	JCCA 1999; 43(3):161–167.	Case study	3	Clinical
Polkinghorn, Colloca <sup>21</sup>	JMPT 1998; 2(1):187–196.	Case report	3	Clinical
Cooperstein <sup>26</sup>	Chiropractic Technique 1997; 9(3):108–114.	NA	3	Na

Polkinghorn <sup>32</sup>	Chiropractic Technique 1995; 7:98–102.	Case study	3	Clinical
Phillips <sup>47</sup>	Chiropractic: The Journal of Chiropractic Research and Clinical Investigation, 1992; 8(2):38–39.	Case study	3	Clinical
Richards, Thompson, Osterbauer, Fuhr <sup>49</sup>	Am J Chiro Med 1990; 3:25–32.	Case studies	3	Clinical

Author	Number	Ages	Intervention	Results
Wood, Colloca, Mathews <sup>6</sup>	30 (11 men, 19 women)	23–59 years old	Manual versus mechanical adjusting techniques	In the absence of epidemiological data, case report or case series reporting no adverse reaction are as valid as those that report adverse reaction.
Keller, Colloca <sup>8</sup>	40		AII (max setting) vs sham (AII min setting) vs 20 min rest	Y; 70% of SMT increased myoelectric output by > 10% (approx range, –10% to 65%); 20% of sham increased myoelectric output by > 10% (approx range, –10% to 25%); 20% of control increased myoelectric output by > 10% (approx range, –15% to 75%). 20.5% mean increase in myoelectric output for SMT group by paired t-test ( $p < 0.001$ )
Gemmell, Jacobson <sup>23</sup>	85 consecutive established LBP patients	18–75 years old	Activator treatment protocol full-spine	In the absence of epidemiological data, case report or case series reporting no adverse reaction are as valid as those that report adverse reaction.
Yates, Lamping, Abram, Wright <sup>54</sup>	21	Mean Age 45.14 (Active); 51.71 (Placebo); 51.43 (Control); $p < 0.255$	Active Group- Activator Placebo group-Sham Control- No Treatment	In the absence of epidemiological data, case report or case series reporting no adverse reaction are as valid as those that report adverse reaction.

Solinger <sup>12</sup>	NA	NA		The article reports results of an analytical model of spinal manipulation that matches the displacement profiles from experimental data on AII. The model then computes biomechanical parameters (e.g. stiffnesses, resonant frequencies etc). The close fit of model and experimental displacements and associated calculated properties that also match experimental data in the literature validates vertebral displacement data. Such displacements are consistent with small ranges (fractions of a degree or millimetre) primarily around the neutral zone of the motion segment. This data demonstrates that no end range or extreme displacements potentially harmful to the patient are feasible from the thrust phase induced by the AII MAD instrument.
Fuhr, Green, Colloca, Keller <sup>25</sup>	20	YF (mean age 23.8), YM (26.8), OF (56.4), YF (57.7)	Quantification of frequency response functions (FFT) and loads (force, acceleration)	Loads well within biological tolerance.
Kawchuk, Herzog <sup>42</sup>	5 (1 for each technique)		Cervical SMT	In the absence of epidemiological data, case report or case series reporting no adverse reaction are as valid as those that report adverse reaction.



Triano <sup>1</sup>	Na	Na	Na	The chapter discusses the use of “impulse hammers” or mechanically assisted methodologies Within the context of other forms of spinal manipulative therapy. It is noted that mechanical adjusting instruments “hold the advantage of permitting the physician to effect the highest degree of control on applied force direction while eliminating applied moments.” Additionally, it is stated that such mechanical adjusting instruments provide a very short duration load (<20 ms) at peak forces comparatively lower than manual type thrusts.”
Polkinghorn, Colloca <sup>2</sup>	1	35	AAI	In the absence of epidemiological data, case report or case series reporting no adverse reaction are as valid as those that report adverse reaction.
Triano <sup>4</sup>	Na	Na	Na	Triano reports the spinal loads were the same for 66 HVLA procedures and various activities of daily living. Volunteers tolerated higher neck load levels associated sudden neck movements than with SMT. Triano notes that SMT is a procedure that requires some level of skill to be performed expertly, and that differences in skill level between the expert and novice have been documented.

Nykoliation, Mierau <sup>20</sup>	3	Female, age range 32–48.	MAD	Patient 1 has no documentation of the diagnosis or “surgical” interventions. Poor quality clinical report. Patient 2 has no adverse reaction from treatment with AII. The “adverse” affect is of delayed appropriate therapy which is a management decision not a technique issue. Patient 3 reports injury by a provider who has little to no training in use of the MAD device. No pathoanatomical studies are presented to confirm claim of damage to vertebral artery circulation.
Polkinghorn, Colloca <sup>21</sup>	1	M 26 YOA,	Activator treatment 8 weeks	Single case study – MRI evidence of disc herniation not convincing. No recent MRI or post-tx MRI
Cooperstein <sup>26</sup>	Na	Na	Na	With regard to Safety, this study notes the following: “The percussive instrument is thought to lower the risk of iatrogenic postmanipulative injuries. “The Activator technique, because of its controlled force and displacement, is widely considered to be a safe, non-traumatic method of chiropractic care (p.111).” NOTE: This quote is from Slosberg in Today’s Chiropractic which is a non-refereed journal and should be noted that it is an opinion statement as the writer’s opinion supported only by another’s opinion
Polkinghorn <sup>32</sup>	1	50 y/o female	AAI	Oncologist consulted and approved tx to shoulder as long as it did not involve “forceful” manipulation. Oncologist reviewed progress and returned patient for more of same.

Phillips <sup>47</sup>	1		Application of activator method	In the absence of epidemiological data, case report or case series reporting no adverse reaction are as valid as those that report adverse reaction.
Richards, Thompson, Osterbauer, Fuhr <sup>49</sup>	2	Case One: 54-yr-old male Case Two: 36-yr-old female	pelvic blocking, high force Galvanic, passive weight assisted stretching, adjustments with Activator	In the absence of epidemiological data, case report or case series reporting no adverse reaction are as valid as those that report adverse reaction.

## APPENDIX D

### EVIDENCE TABLE ON EDUCATIONAL REQUIREMENTS

Education				
Author	Reference	Study Design	Class	Clinical/Experimental
Colloca, Keller, Gunzberg, Vandeputte, Fuhr <sup>10</sup>	JMPT 2000; 23(7):447–457.	Case study	3	Clinical
Gleberzon <sup>14</sup>	JCCA 2000; 44(3)157–168.	Experimental	3	Experimental
Polkinghorn <sup>22</sup>	JMPT 1998; 21(2):114–121.	Case study	3	Clinical
Cooperstein <sup>26</sup>	Chiropractic Technique 1997; 9(3):108–114.	Review of the Literature	3	
Osterbauer, Fuhr <sup>50</sup>	Chiropractic Technique 1990; 2(4):168–175.	Survey	3	

Author	Number	Ages	Intervention	Results
Colloca, Keller, Gunzberg, Vandeputte, Fuhr <sup>10</sup>	1	Na	Application of AA11 Activator Methods	The authors argue that distractive and compressive loads have resulted in differing neurophysiologic sensitivity. If therapy is to be effective, the directional sensitivity of mechanosensitive afferent provides a rationale for the need for a mechanosensitive education and training of the practitioner who applies SMT
Gleberzon <sup>14</sup>	150 students randomly assigned to 16 groups		Literature review and report	Recommended techniques to be added to the curriculum in rank order are Thompson (100%), Gonstead (97%), Activator (94%). ...
Polkinghorn <sup>22</sup>	1		Application Activator Adjusting Instrument	Patient showed complete resolution of symptoms after 3.5 months.
Cooperstein <sup>26</sup>			Activator Adjusting Instrument	With regard to Educational standards, this study mentions, “AMCT is taught in several of the chiropractic colleges.”
Osterbauer, Fuhr <sup>50</sup>	Na	Na	Survey	Table 2 indicates that 8 Chiropractic Colleges offer AMCT as either an elective course or in postgraduate training.